UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,073	01/11/2002	Walter Clark Milliken	01-4001	6512

28120 7590 07/10/2006

FISH & NEAVE IP GROUP
ROPES & GRAY LLP
ONE INTERNATIONAL PLACE
BOSTON, MA 02110-2624

EXAMINER	
WONG, WARNER	

ART UNIT	PAPER NUMBER
2616	

DATE MAILED: 07/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/044,073	MILLIKEN ET AL.	
	Examiner	Art Unit	
	Warner Wong	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *39 and 40* is/are allowed.

6)☒ Claim(s) *1-18,23-32,37 and 38* is/are rejected.

7)☒ Claim(s) *19-22 and 33-36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Marco (6,266,337) in view of Callon (6,870,849) and Chen (US 6,859,433).

Regarding claim 1, Marco describes a method for determining the packet signature (cyclical redundancy check CRC) value in a router, comprising:

receiving a packet at the router (col. 4, lines 19-20);

zeroing out the selected fields, and computing the signature of the received packet (replacing) the CRC (/signature) of the packet (col. 4, lines 20-27, where the packet CRC and TTL fields are the selected fields being zeroed out for the computation of a new CRC signature);

Marco fails to describe: computing a signature (CRC hash value) of the router's network address.

Callon describes: computing a signature (CRC hash value) of the router's network address (col. 5, lines 39-48, 53-56 & col. 6, lines 44-49, where the hash value/signature is initially computed) for the purpose of providing a unique value to the router/node and identifies a unique transmitting path).

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to incorporate the initial computation of the node's signature when recalculating the packet CRC for transmission. The motivation is that it provides a unique value to the router/node and identifies a unique transmitting path.

Marco further describes that the method is used at the ingress point of a network (Marco, fig. 1, located at transmission/starting point of the network). Marco and Callon combined fails to describe:

using the signature in determining a point of ingress for the packet when it entered a network.

Chen describes:

using the signature in determining a point of ingress for the packet when it entered a network (col. 5, lines 50-56, where the calculated CRC (signature) modulo value is used to determine the output port [ingress to the core network]).

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to describe using the signature in determining the output port (ingress point) to the network as per Chen for the combined method of Marco and Callon.

The motivation for combining the teachings is that it provides increase the overall network data communication efficiency (Chen, col. 3, lines 19-22).

Regarding claim 2, Marco further describes that the selected fields may be a checksum or time-to-live field (col. 4, lines 20-27, where the packet CRC = checksum);

Regarding claims 3, Marco and Callon combined further describe that the signature of the packet network address being a CRC (Marco, col. 4, lines 20-21) and the signature of the router's network address also being a CRC (Callon, col. 5, lines 53-56).

Regarding claim 4, Marco further describes that the CRCs can be CRC-32 (col. 4, lines 22-24).

Regarding claim 5, CRCs, per definition and as well-known in the art, can be classified as a type of hash values in a computation (see also Callon, col. 2, lines 12-14 & col. 5, lines 53-56).

2. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marco in view of Callon and Malan (2002/0032871).

Regarding claim 6, Marco describes a method archiving signatures with packets received at nodes in a network, comprising:

receiving packets at a plurality of the nodes in the network (col. 4, lines 19-20);

computing the second signature of the packet (col. 4, lines 20-21, where the packet CRC is the second signature being calculated);

archiving CRCs (second signatures) in a memory device (fig. 4, #106 & col. 4, lines 30-32 &).

In view of claim 6, Marco lacks what Callon describes:

computing at each network node a first signature (CRC hash value) of its network address (col. 5, lines 39-48, 53-56 & col. 6, lines 44-49, where the CRC hash value is

initially computed) for the purpose of providing a unique value to the router/node and identifies a unique transmitting path.

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to incorporate the initial computation of the node's signature when recalculating the packet CRC for transmission. The motivation is that it provides a unique value to the router/node and identifies a unique transmitting path.

Marco and Callon combined fail to describe:

providing the archived one or more computed second signatures to an agent for tracing a path that a given packet traversed in a network.

Malan describes:

providing the archived one or more computed second signatures to an agent for tracing a path that a given packet traversed in a network (paragraphs 77 & 78, where the controller 24 (agent) is used to trace a path that the attack (given) packet traversed in a network using the attack packet's signature (computed second signature)).

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to describe using the signature for tracing a path that a given packet traversed in a network as described by Malan for the combined method of Marco and Callon.

The motivation for combining the teachings is that it provides a method for tracking and blocking DoS attacks over a computer network (Malan, paragraph 27).

Regarding claim 7, Marco further describes computing a CRC of each received packet (col. 4, lines 20-21, where the packet CRC is calculated).

Regarding claim 8, CRCs, per definition and as known in the art, can be classified as a type of hash values in a computation (see also Callon, col. 2, lines 12-14 & col. 5, lines 53-56).

Regarding claim 9, Marco further describes that the CRCs can be CRC-32 (col. 4, lines 22-24).

3. Claim 10-13, 15 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marco in view of Malan.

Regarding claim 10, Marco describes a method of archiving signatures associated with packets received at a node in a network, comprising:

receiving packets at the node (col. 4, lines 19-20);

computing a signature (CRC) for each received packet (col. 4, lines 20-21, where the packet CRC is calculated);

aggregating the computed signature (CRC) in a first memory to produce signature vectors (hash table of CRCs), and archiving the table in a second memory (col. 4, lines 37-39, where memory holding the calculated checksum is different from the hash table memory, fig. 2, #54).

Marco fails to describe:

providing the archived one or more computed second signatures to an agent for tracing a path that a given packet traversed in a network.

Malan describes:

providing the archived one or more computed second signatures to an agent for tracing a path that a given packet traversed in a network (paragraphs 77 & 78, where the controller 24 (agent) is used to trace a path that the attack (given) packet traversed in a network using the attack packet's signature (computed second signature)).

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to describe using the signature for tracing a path that a given packet traversed in a network as described by Malan for the method of Marco.

The motivation for combining the teachings is that it provides a method for tracking and blocking DoS attacks over a computer network (Malan, paragraph 27).

Regarding claims 11, Marco further describes computing a CRC of each received packet (col. 4, lines 20-21, where the packet CRC is calculated).

Regarding claim 12, CRCs, per definition and as well-known in the art, can be classified as a type of hash values in a computation (see also Callon, col. 2, lines 12-14 & col. 5, lines 53-56).

Regarding claim 13, Marco further describes that the computed CRCs are CRC-32 (col. 4, lines 22-24).

Regarding claim 15, Marco further describes that the signatures (computed CRC) are aggregated over a collection interval (col. 5, lines 9-19, where the CRCs are aggregated in a hash table for a certain time interval until they are old).

Regarding claim 17, Marco further describes storing the fraction of the CRC table in the data memory by the collection interval (col. 4, lines 37-39 & col. 5, lines 9-

19, where the CRC table is a fraction of all CRCs archived over time because older checksums are periodically being cleared).

Regarding claim 18, Marco further describes that the archived signature vectors (CRC table) are cleaned/discarded over time (P seconds) (col. 5, lines 9-19, where the periodic clearing/deletion of old checksums may be P seconds).

4. Claims 14 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marco in view of Malan as applied to claim 10, and further in view of Sato (6,947,442).

Regarding claims 14, Marco and Malan combined fails to describe that the second memory comprises a ring buffer.

Sato describes: the second memory comprises a ring buffer (fig. 8 and col. 8, lines 61-62, where the memory is the second memory) for the purpose of speeding up the processing performed within the node.

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to deploy a ring buffer memory scheme. The motivation is that it speeds up the processing performed within the node (col. 4, lines 37-42).

Regarding claims 23, Marco and Malan combined fails to describe that the second memory comprises a DRAM.

Sato describes: the second memory comprises a DRAM (col. 8, lines 61-62) for the purpose of allowing high speed data transfers.

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to use DRAM as the second memory as in Sato for the method of Marco. The motivation is that this memory type allows high speed data transfers (Sato, abstract & col. 1, lines 40-41, 56-58).

5. **Claims 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Marco in view of Malan as applied to claim 15 above, and further in view of Carr (6,519,264).

Regarding claim 16, Marco and Malan combined fails to describe:

storing signatures in the second memory indexed by the collection interval.

Carr describes:

storing signatures (VC) in the second memory indexed by the collection interval (fig. 3, step 52 & col. 11, lines 50-52, where a VC = signature and T = indexed collection window interval to the buffer depicted in fig. 4, #20 & 22) for the purpose of allowing continuous memory approach for storing means.

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to use the collection window interval for indexing a memory as in Carr for the combined method of Marco and Malan. The motivation is that this approach allows continuous memory approach for storing means, versus a limited time-based storage by a finite linear array/memory (Carr, col. 10, lines 46-55).

6. Claims 24-27, 29 and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marco.

Regarding claim 24, Macro describes an apparatus for archiving signatures (CRC) associated with the received packets in a network, comprising:

a first and second memory ((col. 4, lines 37-39, where [first] memory holding the calculated checksum is different from the hash table memory, fig. 2, #54);

a signature tap (fig. 2, CRC generator 50) configured to:

receive packets at the node (col. 4, lines 20-21);

compute one or more signatures for each of the received packets (col. 4, lines 21-22);

a controller (fig. 2, packet routing controller 58) configured to:

archive the signature vector (CRC table) in the second memory (col. 4, lines 21-22 and fig. 2, CRC table #54 the in data memory #56);

In view of claim 24, Marco fails to describe:

a multiplexer for to multiplex/aggregate computed signatures stored in first memory into one signature vector to be archived in the second memory

The examiner takes official notice that it is common practice in the current state of art of storage to multiplex/aggregate computed signatures (inherently in a first memory) to be stored in a second memory (as per Lloyd in US patent 5,802,522, col. 2, lines 31-34, where common data elements (signatures) are grouped and stored in data blocks (vectors)).

The motivation for grouping the data elements for storing the data is that it reduces the amount of time need to load data from mass storage back into the memory (Lloyd, col. 1, lines 39-41 & col. 2, lines 25-27).

Regarding claim 25, Marco further describes that the signature vectors (CRC table) comprises CRC values (col. 4, lines 21-22);

Regarding claim 26, Marco further describes that the signature vectors (CRC hash table) comprises CRC values (col. 4, lines 31-33), which inherently is considered as hash values.

Regarding claim 27, Marco further describes that the CRCs are CRC-32's (col. 4, lines 21-24).

Regarding claim 29, Marco further describes adding/aggregating signatures (CRCs) over a collection interval (col. 4, lines 37-39 & col. 5, lines 9-19).

Regarding claim 31, Marco further describes storing the fraction of the signature vectors (CRC table) in the data memory by the collection interval (col. 4, lines 37-39 & col. 5, lines 9-19, where the CRC table is a fraction of all CRCs archived over time).

Regarding claim 32, Marco further describes that the archived signature vectors (CRC table) are cleaned/discarded over time (P seconds) (col. 5, lines 9-19, where the periodic clearing/deletion of old checksums may be P seconds).

7. **Claim 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Marco as applied to claim 24, and further in view of Sato (6,947,442).

Regarding claim 28, Marco fails to describe that the second memory comprises a ring buffer.

Sato describes: the second memory comprises a ring buffer (fig. 8 and col. 8, lines 61-62, where the memory is the second memory) for the purpose of speeding up the processing performed within the node.

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to deploy a ring buffer memory scheme.

The motivation for combining the teachings is that it speeds up the processing performed within the processing node (col. 4, lines 37-42).

8. **Claims 30** is rejected under 35 U.S.C. 103(a) as being unpatentable over Marco as applied to claim 29, and further in view of Carr (6,519,264).

Regarding claim 30, Marco fails to describe:

storing signatures (VC) in the second memory indexed by the collection interval.

Carr describes:

storing signatures (VC) in the second memory indexed by the collection interval (fig. 3, step 52 & col. 11, lines 50-52, where a VC = signature and T = indexed collection window interval to the buffer depicted in fig. 4, #20 & 22) for the purpose of allowing continuous memory approach for storing means.

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to use the collection window interval for indexing a memory as in Carr for the method of Marco.

The motivation for combining the teachings is that this approach allows continuous memory approach for storing means, versus a limited time-based storage by a finite linear array/memory (Carr, col. 10, lines 46-55).

9. **Claim 37** is rejected under 35 U.S.C. 103(a) as being unpatentable over Marco as applied to claim 24, and further in view of Sato (6,947,442).

Regarding claim 37, Marco fails to describe that the second memory comprises a DRAM.

Sato describes that the second memory comprises a DRAM (col. 8, lines 61-62) for the purpose of allowing high speed data transfers.

It would have been obvious to one with ordinary skill in the art at the time of invention by applicant to use DRAM as the second memory as in Sato for the method of Marco.

The motivation for combining the teachings is that this memory type allows high speed data transfers (Sato, abstract & col. 1, lines 40-41, 56-58).

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. **Claim 38** is rejected under 35 U.S.C. 102(e) as being anticipated by Marco.

Marco describes a method of archiving CRCs (signatures) associated with packets received at a node in a network, comprising:

receiving packet at the node (col. 4, lines 20-21);

computing signatures (CRCs) in a first memory to produce a signature vectors (CRC hash table) (col. 4, lines 20-21 & 37-39, where new CRCs are computed and stored in the CRC hash table);

adding/aggregating the computed signatures (CRCs) in a first memory to produce the CRC table (signature vector) which is archived in the data (second) memory (col. 4, lines 37-39 and fig. 2, #160).

Allowable Subject Matter

12. Claims 19-22 and 33-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Claims 39-40 allowed.

The following is a statement of reasons for the indication of allowable subject matter:

For claim 39, the prior art fails to disclose the limitations of "using each of the one or more signatures as addresses for addressing bit location in the first memory, and set memory bits in the addresses of the first memory corresponding to each of the one or

more signatures", where a [packet] signature corresponds to a digital signature of either a CRC, checksum, or hash value as known in the art and per the specification.

For claim 40, the prior art fails to disclose the limitations of "store, over a collection interval, the determined at least one signature packet for each of the plurality of received packets in the first memory to produce a signature vector that comprises a block of plurality of signatures for at least a portion of the received packets", where a [packet] signature corresponds to a digital signature of either a CRC, checksum, or hash value as known in the art and per the specification.

Response to Arguments

14. Applicant's arguments with respect to claims 1-36 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Stacey (2005/0213570) and Levy (US 6,134,662).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Warner Wong whose telephone number is 571-272-8197. The examiner can normally be reached on 6:30AM - 3:00PM, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Warner Wong
Examiner
Art Unit 2616

WW

RICKY Q. NGO
SUPERVISORY PATENT EXAMINER